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मानक

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Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 15864 (2009): MULTICOLOUR-PROCESS OFFSET PRINTING INKS
[CHD 14: Printing, Inks, Stationary and Allied Products]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक
बहुरंगी-प्रक्रिया ऑफसेट मुद्रण के लिए
स्याहियाँ — विशिष्टि

Indian Standard
MULTICOLOUR-PROCESS OFFSET PRINTING
INKS — SPECIFICATION

ICS 87.080

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Printing Inks, Stationery and Allied Products Sectional Committee had been approved by the Chemical Division Council.

This standard covers inks intended for four-colour printing by offset process, in defined order of printing colour and describes the colour control method.

This standard will also assist the photolithographers in making colour separations for offset printing based on an identical scale so that, irrespective of their different origin, various subjects for colour printing may be assembled on the same montage.

This standard will enable lithographic and other printers to obtain printing inks which, when applied under the conditions specified in this specification and to standard reference paper, can produce results complying with the stipulations of this standard.

This standard has taken reference of ISO 2846 : 1975 'Set of printing inks for offset printing — Colourimetric characteristics' published by the International Organization for Standardization (ISO), and is in technical conformity with CEI specification 13-67 of the European Committee of the Paint and Printing Ink Manufacturers' Association, defining a 'European set of primary colours for offset printing'.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

MULTICOLOUR-PROCESS OFFSET PRINTING INKS — SPECIFICATION

1 SCOPE

This standard prescribes requirements and methods of sampling and colour assessment for a set of primary inks intended for four-colour printing by offset process in definite order of printed colour and also prescribes the control method.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	Title
4395 : 1987	Glossary of terms relating to inks and allied industries (<i>first revision</i>)
6931 : 1972	Methods of test for printing inks

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 4395, in addition to the following, shall apply.

3.1 Primary Colours — Colours of individual prints from yellow, magenta, cyan and black inks produced under standard conditions and of which the colourimetric definitions correspond to the numerical values given in 5.2.

3.2 Reference Inks — Yellow, magenta, cyan and black inks from which primary and secondary colours are obtained conforming to the set defined in this standard.

3.3 Reference Paper — Lightfast paper, coated on both sides without optical bleaching agents, containing no mechanical wood pulp and with an approximate grammage of 100 g/m², which provides a satisfactory print with a screen of 48 lines/cm. The paper should be as chemically neutral as possible.

3.4 Standard Set — A series of four primary inks intended for four-colour printing of which the colourimetric characteristics comply with the specifications of this standard.

4 REQUIREMENTS

4.1 Composition

The inks shall consist of a suitable dispersion of yellow, magenta, cyan pigments and carbon black in oleoresinous varnish, vegetable and/or hydrocarbon oils and additives or toners (if required), as deemed to qualify for offset ink — yellow, magenta, cyan and black ink for multi-colour process printing on coated/uncoated stock.

4.1.1 There are various kinds of multi-colour process offset printing machines and the inks should have good print characteristics and good machine runnability on uncoated/coated stocks.

4.1.2 The ink shall have sufficient colour strength to produce prints matter of 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18 points range and shall be able to produce clear and sharp prints with no filling-in or spreading of half-tones. The print shall be comparable to the approved/standard set with uniform prints lay.

4.2 Hue

The hue shall be comparable with the approved/standard inks, when tested as per method prescribed in 4.1 of IS 6931.

4.3 Tinting Strength

The tinting strength of the ink shall be within ± 5 percent of the approved/standard ink, when tested by the method prescribed in 4.2 of IS 6931.

4.4 Fineness of Dispersion

The material shall not be coarser than 6 microns, when tested for fineness of dispersion of pigments particles in the medium as per the method prescribed in 4.5 of IS 6931.

4.5 Printing Strength, Distribution and Covering Power

The ink shall be considered to possess satisfactory covering power and distribution property if no white areas or specks show through the dried film of the ink, when tested by the method prescribed in 4.6 of IS 6931.

using a standard printability tester or a suitable proofing machine.

4.6 Strike Through

The ink shall not exhibit any strike through, when tested by the method prescribed in 4.7 of IS 6931.

4.7 Drying Time

The ink shall dry as quickly as the approved/standard ink, when tested by the method prescribed in 4.9 of IS 6931.

4.8 Setting Time

The setting time of the ink shall be equal to that of the approved/standard ink, when tested by the method prescribed in 4.10 of IS 6931.

4.9 Tack

The tack of the ink shall be within ± 5 percent of the approved/standard ink, when tested by the method prescribed in 4.8 of IS 6931 using any standard tack measuring instrument.

4.10 Lithographic Resistance to Fountain Solution

The ink shall pass the test prescribed in 4.15 of IS 6931.

4.11 Printing Quality

The ink shall pass the test prescribed in 5.

5 TEST METHOD

5.1 Principle

5.1.1 Each colour in the set obtained by printing is assessed according to its visual appearance by the values of the colourimetric steps established from measurements made in accordance with the spectrophotometric methods of colourimetry.

5.1.2 Reference inks are printed solid at the reference thickness and on reference paper.

5.2 Colourimetric Characteristics and Tolerances

The numerical values of the colourimetric characteristics of the specified primary colours are given in Table 1.

5.3 Preparation of Test Specimens

5.3.1 Primary Colours

5.3.1.1 Prepare on reference paper a series of test specimens with desired ink film thickness, printed solid in accordance with the letterpress system and at a reproducible speed on equipment for testing printability. The quantity of ink applied is checked by

weighing the printing plates both before and after printing.

Table 1 Numerical Values of Colourimetric Characteristics of the Specified Primary Colours (Clauses 5.2 and 5.5)

Printing Inks	<i>L</i>	<i>a</i>	<i>b</i>	<i>c</i>	<i>h</i>
Yellow	88.45	-12.36	103.28	104.01	96.82
Magenta	43.39	74.34	-2.95	74.40	357.72
Cyan	54.75	-28.12	-45.87	53.80	238.49
Black	8.58	1.49	4.34	4.59	71.11

NOTE

L = lightness or darkness of the colour,

a = position of the colour in red/green axis,

b = position of the colour in yellow/blue axis,

c = chroma/purity of the colour, and

h = the hue of the colour.

5.4 Colourimetric Evaluation of the Test Specimens

5.4.1 Calibration

The spectrophotometer should be calibrated before taking a measurement. The calibration is to be done on an absolute white base provided with the machine. The equipment should be kept clean. The room should be reasonably dust free.

5.4.2 The prints, when completely dry, are spectrophotometrically measured, placing them on a pile of at least five unprinted sheets of the reference paper before assessment.

5.4.3 The spectrophotometric curve is plotted using a spectrophotometer with 45/0 geometry, in other words with the incident light at 45° to the specimen and measurement at right angles to it.

5.4.4 Calculations from the spectrophotometric curves called Spectral Curves (% reflectance vs. wavelength) are made for illuminant D65 from ordinates at 10 nm intervals by multiplication with the appropriate normality coefficients.

5.4.5 The measurement is done by taking the average value of three readings for a particular job.

5.5 Expression of Test Results

ΔE , the colour difference between master specimen and specimen under examination, is calculated as follows:

$$\Delta E = \sqrt{(L_2 - L_1)^2 + (a_2 - a_1)^2 + (b_2 - b_1)^2}$$

where

L_1, a_1, b_1 = Reference value of the master specimen (see Table 1), and

L_2, a_2, b_2 = corresponding values for the test specimens.

In addition, c and h depict the chroma and hue, which help in understanding comparative differences of master and specimen under examination.

$$c = \sqrt{(a^2 + b^2)}$$

$$h = \text{Arctan} \frac{b}{a}$$

The colour difference (ΔE) shall be below 2 to get good colour match, keeping all other parameters constant.

6 PACKING AND MARKING

6.1 Packing

The material shall be packed in suitable containers as agreed to between the purchaser and the supplier.

6.2 Marking

The containers shall be marked legibly and indelibly with the following information:

- Name of the material,
- Description of the colour set (four colour or three colour with name of individual colours),
- Batch number,
- Date of manufacture,
- Indication of the source of manufacture, and
- Net mass of the material.

6.2.1 BIS Certification Marking

The containers may also be marked with the Standard Mark.

6.2.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

7 SAMPLING

Representative samples of the material shall be drawn and adjudged as prescribed in Appendix A of IS 6931.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Printing Inks, Stationery and Allied Products Sectional Committee, CHD 14

Organization	Representative(s)
Government of India Stationery Office, Kolkata	SHRI R. K. ROY (<i>Chairman</i>)
All Indian Federation of Master Printers, New Delhi	SHRI V. N. CHHABRA SHRI V. K. MALIK (<i>Alternate</i>)
Asian Ink Company, New Delhi	SHRI Y. M. CHANDHOK SHRI M. CHANDHOK (<i>Alternate</i>)
Bank Note Press, Dewas (MP)	SHRI B. K. KHER
Consumer's Forum, New Delhi	REPRESENTATIVE
Currency Note Press, Nasik	SHRI GANGA PRAKASH SHRI SUMIT SINHA (<i>Alternate</i>)
Directorate of Printing, New Delhi	SHRI R. S. WADHWA SHRI N. V. RADHAKRISHNAN (<i>Alternate</i>)
DIC India Ltd, Kolkata	SHRI UTSAV CHOWDHURI
Government of India Stationery Office, Kolkata	SHRI ATANU BANDOPADHYAY
Kores India Ltd, Mumbai	SHRI S. M. KHANNA SHRI K. K. MISHRA (<i>Alternate</i>)
Kriskem Industries, Ghaziabad	SHRI V. K. SHARMA
Ministry of Communication, New Delhi	SHRI L. K. PURI
National Archives of India, New Delhi	DR R. P. MALIK DR (SMT) YOSHADHARA JOSHI (<i>Alternate</i>)

<i>Organization</i>	<i>Representative(s)</i>
National Institute of Science Communication and Information Research, New Delhi	SHRI PANKAJ GUPTA SHRI K. B. NAGPAL (<i>Alternate</i>)
National Test House (NR), Ghaziabad	DR S. K. SAHA DR S. CHATTERJEE (<i>Alternate</i>)
Office of the Development Commissioner (SSI), New Delhi	SHRI JUGAL KISHOR SMT SUNITA KUMAR (<i>Alternate</i>)
Office of the Director, Northern Printing Group, Dehra Dun	SHRI GUR PRASAD SHRI BHAGWAN SINGH (<i>Alternate</i>)
Rainbow Ink & Varnish Manufacturing Co Ltd, Mumbai	SHRI HABIB H. CONTRACTOR DR P. C. CHATTERJEE (<i>Alternate</i>)
Sakata Inx (India) Ltd, New Delhi	SHRI AKASH BARTHAKUR
Shriram Institute for Industrial Research, Delhi	DR P. K. KAICHER SHRI A. MAJUMDAR (<i>Alternate</i>)
SICPA India Ltd, New Delhi	SHRI N. C. SHARMA SHRI A. B. SACHAN (<i>Alternate</i>)
The All India Plastic Manufacturers Association, Mumbai	SHRI RAJIV JAIN SHRI SUNIL MONGA (<i>Alternate</i>)
BIS Directorate General	SHRI E. DEVENDAR, Scientist 'F' & Head (CHD) [Representing Director General (<i>Ex-officio</i>)]

Member Secretary

SHRI S. N. CHATTERJEE
Scientist 'E' (CHD), BIS

Bureau of Indian Standards

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

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